

CHARBERT

Volatile Organic Compound Ambient Air Sampling Results

30 June 2004

The Rhode Island Department of Environmental Management (RI DEM) collected ambient air samples at two off-site locations near the Charbert, Division of NFA Corp. facility (Charbert) in Richmond on Thursday, 24 June 2004. Samples were collected in evacuated canisters for a 30-minute period beginning at 5:45 AM and were analyzed for volatile organic compounds (VOCs) on a gas chromatograph/mass spectrometer by the Department of Health Air Pollution Laboratory.

The sampling were collected at the south end of River Street and at the south end of Myrtle Avenue. These sites are on the perimeter of Charbert's property, north to northeast of the lagoons and southeast of the manufacturing facility. During the sampling period, there was a light variable wind and a light rotten egg/perfume odor was present at both sites.

Sample results are shown in the table in Appendix A. For comparison purposes, the table also shows the results of a VOC sample taken at the same time at RI DEM's East Providence monitoring site, which is in a residential area of East Providence. The concentrations of the VOCs in the Richmond samples are consistent with the levels of VOCs in non-urban background air and are generally lower than those in the East Providence sample.

The attached table also lists cancer and noncancer health benchmark levels for the substances measured, where available. These levels were developed by the United States Environmental Protection Agency, the California Office of Environmental Health Hazard Assessment and the United States Agency for Toxic Substances and Disease Registry and have been incorporated into RI DEM's Air Toxics Regulation (Air Pollution Control Regulation No. 22).

For most noncancer health effects, exposures above a threshold concentration may cause health effects while exposure to levels below that threshold are generally considered to be safe. The noncancer health benchmarks listed in the attached table include substantial safety factors; therefore, exposure to concentrations below those levels are very unlikely to result in noncancer health effects. All of the concentrations measured in Richmond and in East Providence are substantially below the noncancer health benchmarks.

Cancer, however, is thought to be a non-threshold effect in many cases. Therefore, exposures to even very low levels of carcinogens result in a small increased cancer risk. The cancer health benchmarks shown in the attached table correspond to a minimal risk level, an increased cancer risk of one-in-one-million; on average, if a million people were exposed to that concentration for a lifetime, one person would develop cancer as a result of that exposure.

Note that, although the VOC concentrations are lower in Richmond than in East Providence, the concentrations of five of the substances are equal to or exceed the one-in-one-million cancer risk benchmark at both locations (and throughout the state). Two of these substances, 1,3-butadiene and benzene, are emitted by motor vehicles. Two other of the substances, carbon tetrachloride and chloroform, are present in background levels that exceed the one-in-one-million risk benchmark throughout the country.

The fifth substance, tetrachloroethylene (also known as perchloroethylene), is used primarily for dry cleaning in Rhode Island. This substance has been found in water in the area due to historical contamination. However, since the levels of tetrachloroethylene in the Richmond air samples are similar to levels seen in non-urban sites throughout the State, it is unlikely that the concentrations measured are linked to the water contamination. The tetrachloroethylene levels in East Providence were approximately twice as high as those in the Richmond samples.

Note that the samples were taken at 5:45 AM because odors tend to be strongest during the late night and early morning hours, according to reports from neighboring residents and according to the results of the continuous hydrogen sulfide monitor currently located on River Street. On the VOC sampling day, however, hydrogen sulfide levels up to 90 ppb were observed between 4:00 and 5:00 AM, but those levels had decreased to 8 – 21 ppb during the sampling period. RI DEM will try to take another VOC sample at a time when a stronger odor is present in the area.

For more information about the sampling results, please contact Barbara Morin at 222-4700, extension 7012.

Appendix A	South End	South End	East Prov		
Charbert VOC samples	River St.	Myrtle St.	(comparison)	Cancer	Noncancer
	6/24/2004	6/24/2004	6/24/2004	1/million	Benchmark
<u>Name</u>	ppb	ppb	ppb	ppb	ppb
ethylene	1.10	0.98	2.12		
acetylene	0.94	2.42	2.54		
ethane	2.06	2.12	14.28		
propene	0.24	0.21	0.60		2000
propane	3.71	3.27	8.39		
chloromethane	0.73	0.67	0.49		40
isobutane	0.30	0.29	1.22		
1-butene	0.14	0.12	0.49		
1,3-butadiene	0.02	0.03	0.10	0.01	2
butane	0.56	0.52	1.48		
acetonitrile	0.04	0.00	0.16		40
acetone	9.36	0.85	4.46		10000
isopentane	1.17	1.02	2.08		
pentane	0.41	0.43	0.89		
carbon disulfide	0.02	0.01	0.01		200
Methyl-t-butyl-ether	0.58	0.63	1.57		800
2-methylpentane	0.33	0.29	0.67		
methyl ethyl ketone	0.39	0.04	0.56		300
3-methylpentane	0.22	0.17	0.40		
n-hexane	0.23	0.20	0.49		60
1,1,1-trichloroethane	0.02	0.02	0.02		200
benzene	0.22	0.19	0.50	0.04	9
carbon tetrachloride	0.12	0.09	0.09	0.01	6
n-heptane	0.07	0.07	0.25		
toluene	0.67	0.66	1.82		100
ethylbenzene	0.09	0.11	0.26		200
p & m xylenes	0.24	0.28	0.70		20
o-xylene	0.10	0.10	0.25		20
a-pinene	0.92	0.96	0.31		
1,2,4-trimethylbenzene	0.09	0.10	0.25		
trans-2-butene	0.05	0.04	0.10		
cis-2-butene	0.05	0.05	0.10		
1-pentene	0.05	0.05	0.09		
isoprene	0.34	0.55	1.20		
trans-2-pentene	0.07	0.10	0.22		
cis-2-pentene	0.03	0.05	0.09		
dichloromethane	0.11	0.09	0.17	0.60	100
2,2-dimethylbutane	0.04	0.05	0.09		
cyclopentane	0.04	0.04	0.11		
2,3-dimethylbutane	0.11	0.12	0.25		
chloroform	0.04	0.04	0.10	0.01	60
methylcyclopentane	0.14	0.12	0.31		
2,4-dimethylpentane	0.05	0.04	0.09		
cyclohexane	0.05	0.05	0.14		
2-methylhexane	0.10	0.09	0.25		
2,3-dimethylpentane	0.06	0.06	0.11		
3-methylhexane	0.11	0.10	0.25		

Appendix A	South End	South End	East Prov		
Charbert VOC samples	River St.	Myrtle St.	(comparison)	Cancer	Noncancer
trichloroethylene	0.003	0.000	0.04	0.09	100
2,2,4-trimethylpentane	0.16	0.15	0.26		200
methylcyclohexane	0.06	0.05	0.15		
2,3,4-trimethylpentane	0.05	0.05	0.10		
2-methylheptane	0.03	0.02	0.07		
3-methylheptane	0.03	0.02	0.07		
n-octane	0.04	0.03	0.12		
tetrachloroethylene	0.04	0.03	0.07	0.03	5
styrene	0.01	0.02	0.04		200
n-nonane	0.03	0.02	0.11		
isopropylbenzene	0.009	0.009	0.02		
n-propylbenzene	0.02	0.03	0.05		
m-ethyltoluene	0.06	0.06	0.18		
p-ethyltoluene	0.04	0.04	0.08		
1,3,5-trimethylbenzene	0.02	0.02	0.07		
o-ethyltoluene	0.03	0.03	0.07		
n-decane	0.03	0.02	0.14		
p-dichlorobenzene	0.01	0.008	0.12	0.02	100
1,2,3-trimethylbenzene	0.02	0.02	0.06		
m-diethylbenzene	0.004	0.000	0.012		
p-diethylbenzene	0.01	0.02	0.05		
n-undecane	0.03	0.03	0.13		
dodecane	0.03	0.03	0.04		
vinyl chloride	0.000	0.000	0.000	0.09	40
acrylonitrile	0.000	0.000	0.000	0.005	0.9
1,1-dichloroethene	0.000	0.000	0.000	0.005	50
1,1-dichloroethane	0.000	0.000	0.000	0.16	
ethyl acetate	0.000	0.000	0.100		
1,2-dichloroethane	0.000	0.000	0.000	0.01	100
1,2-dichloropropane	0.000	0.000	0.000	0.02	0.9
cis-1,3-dichloropropene	0.000	0.000	0.000	0.04	4
trans-1,3-dichloropropene	0.000	0.000	0.000	0.04	4
1,2-dibromoethane	0.000	0.000	0.000	0.00065	0.8
chlorobenzene	0.000	0.000	0.003		200
1,1,2,2-tetrachloroethane	0.000	0.000	0.000	0.003	400
TNMOC ppbC	156	134	263		
*Note: Total NonMethane Organic Compounds (TNMOC) is in units of					
parts per billion carbon (ppbC)					